

INDEPENDENCE

Earth-sheltered home can let you thumb your nose at energy costs

By Gordy Holt
P-I Reporter

If you have an urge to thumb your nose at WPPSS and the Bonneville Power Administration, be Don Stephens' guest

Energy independence for homeowners is not some futurist's cock-eyed daydream, says the 43-year-old Spokane architect, who has literally dug an international name for himself as an expert in earth-sheltered housing.

A Stephens-designed earth-sheltered home, Independence House, is being created on the Tacoma Dome's floor this week for the Good Earth Exposition on Friday, Saturday and Sunday. The structure will feature a variety of goodies demonstrating the feasibility of energy independence

Also offered at the exposition is a three-day Earth Homes Conference, with Stephens as keynote speaker and presentations by Washington State University Architecture Professor David M. Scott and Kathleen Vadnais, editor of Earth Shelter Living magazine. Conference topics will range from site evaluation to financing of an earth-sheltered structure.

52 degrees year-round

But if you simply want to browse, the exposition will have to plenty to gawk at.

Stephens' earth-sheltered demonstration house sets the theme, and it promises to knock the socks off Reddy Kilowatt.

Because it is earth-sheltered, temperature extremes outside are moderated inside. In Western Washington the ground temperature is a fairly stable 52 degrees year-round, so the home's interior air-conditioning appliances need not grapple with maintaining a livable atmosphere during the extremes of either winter or summer.

What little heat the house's interior spaces need is provided by a heat-holding masonry wood "stove" — called a "Russian fireplace" — as well as a wood-fired cook stove and wood-fired water heater.

Rabbit warms floor

The northwest and northeast walls of the rectangular structure are earth-bermed and super-insulated against the northern exposure. But its southwest and southeast walls, using integrated greenhouses, have been put to work to capture

solar energy and produce foodstuffs.

Stephens explains:

"The southeast greenhouse is designed to function more than aesthetically. It is there we will have food plants growing, but in addition there will be a rabbit cage."

"Don't laugh. One rabbit, Stephens says, gives off enough heat to keep 10 square feet of floor area warm. This heat will benefit the plants, but so will the rabbit's pellets. These, he says, will drop through a screen into an earthworm bin where the worms will turn the pellets into soil for later use as a growing medium.

"Next to the rabbit cage is a fish tank," he says. "You feed worms to the fish and use the fishes' water — nitrogen rich in urea — to fertilize the plants."

Produce carbon dioxide

Both the rabbits and the fish, of course, also provide food for the homeowner.

In darker areas beneath the planting beds are bins to grow mushrooms in more earth created by the worms. These dark areas also can be utilized to grow sprouts.

"These three animal types — the rabbits, the fish and the worms — produce carbon dioxide for the plants, and the plants give off oxygen for the animals," Stephens says.

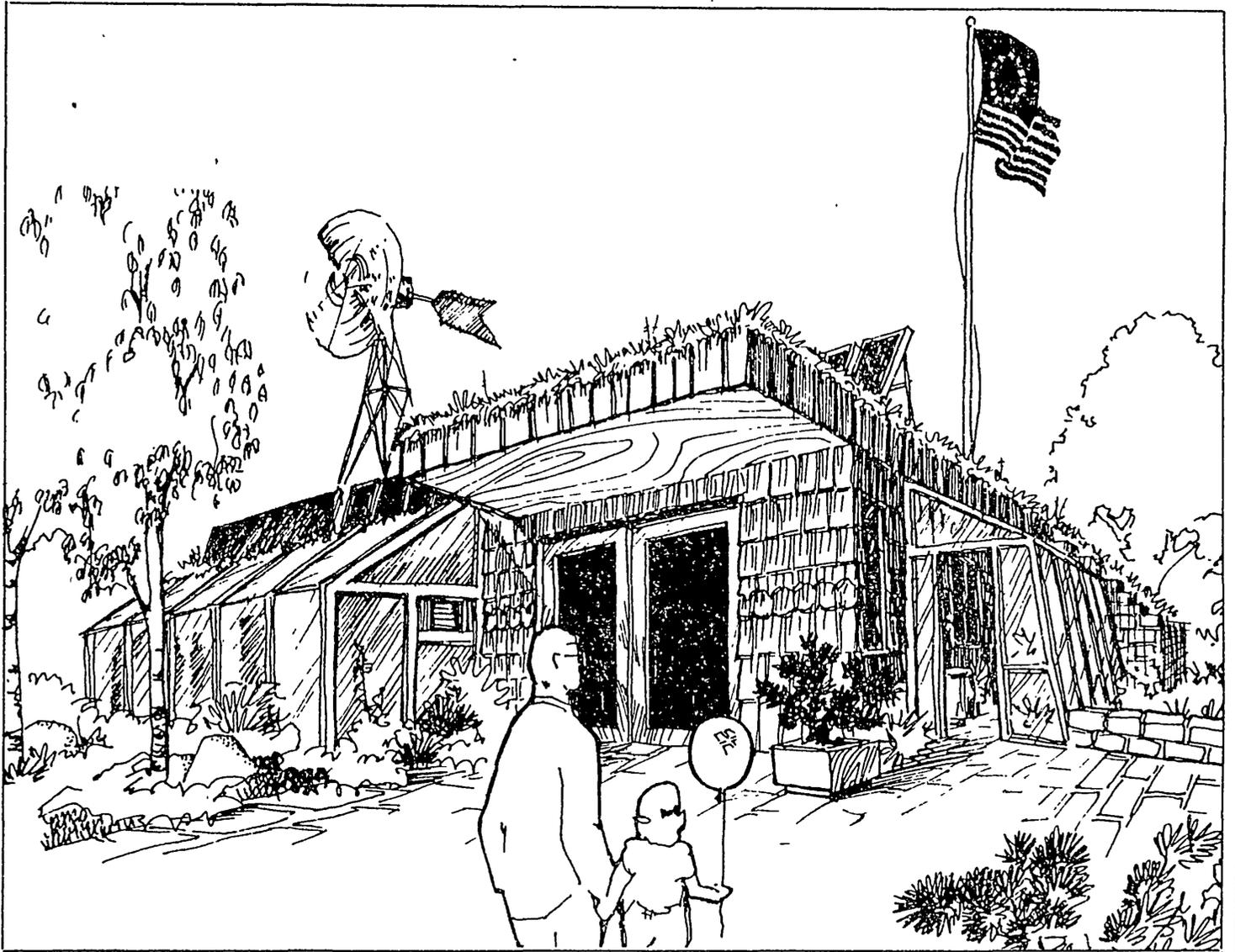
"So you can begin to see why we've called this Independence House," he says.

Stephens calls the southwest greenhouse a "sunspace." It warms air and stores heat in a brick floor and in special wall tubes filled with "phase-change salts" that absorb seven times more heat than water. He says the sunspace can be used as a semi-outdoor patio area for decorator plants, a breakfast table or sunning lounge.

Sailboaters, motorboaters

Microprocessors are used to sense temperature differences throughout, and can be programmed to open vents and turn on blowers that circulate the heated air.

Stephens admits some passive-solar-home proponents may criticize the use of such "gadgets." But, he says, "I think it's important to recognize there are two kinds of homeowners. I call them sailboaters or motorboaters. Sailboaters like to tinker and don't mind fooling around with manually operated vents and



Independence House, an earth-shelter home, is being created in the Tacoma Dome for this week's Good Earth Exposition



Don Stephens, a Spokane architect, will preach the benefits of energy independence this weekend at the Tacoma Dome.

switches. But motorboaters want things taken care of for them.

"If we really are to seriously consider energy independence, we have to keep in mind those who aren't tinkerers but who still want energy freedom."

On the roof is an array of photovoltaic panels that turn sunlight into an electric current. The current feeds the home's 12-volt electrical system, backed by an array of batteries.

Stephens says this system, which is being created by the Solar Trades Council, will provide enough electricity to power special 12-volt appliances — a 12-volt refrigerator/freezer, a 12-volt toaster, a 12-volt television set, a 12-volt computer and a 12-volt lighting system

Wind generator

Traditional homes, by comparison, operate on 110- and 220-volt systems.

"The 12-volt system is one reason why we needed the wood-burning backups for cooking and heating water. It's in keeping with the 'independence' theme," Stephens says.

"We also have installed a wind generator on the roof. It's good support for the solar-electric system, because, all too often when the

wind is blowing, that is when we need heat most."

The house also is rigged to collect, filter and store rainwater, and to filter and reuse the "gray water" from dishwashing and showers for toilets. This alone will save 40 percent on a normal water bill, he says.

'Complete with gizmos'

But the biggest treat in Stephens' house is the price.

"If we were to replicate it as a 1,500-square-foot home with three bedrooms and maybe a bath and a half," he says, "we could do it for about \$80,000 — complete with all the gizmos."

Stephens says square-foot home-building prices for traditional frame houses today begin at about \$40 a square foot. "But a fully contractor-built earth-sheltered home of the same square footage can be built for about \$29 a square foot. If an owner wishes to participate in the building process, you could even get that figure down to about \$10 a square foot."

Pre-registration and a fee of \$40 per person is required for the three-day Earth Homes Conference (call Tacoma, 882-2969). Admission to the Good Earth Exposition is just \$3.50 (\$2.50 for students and seniors)